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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
WEINSTEIN, LEONARD J	
ART UNIT	**PAPER NUMBER**
3746	

MAIL DATE	DELIVERY MODE
10/25/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/771,843	ZAISER ET AL.	
	Examiner	Art Unit	
	Leonard J. Weinstein	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *06 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3,9-24,27 and 33-58* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3,9-24,27 and 33-58* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 August 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the amendment of August 6, 2007. In making the below rejections and/or objections the examiner has considered and addressed each of the applicant's arguments.

2. The examiner acknowledges that claims 1-2, 4-8, 25-26, and 28-32 have been canceled; claims 3, 9, 10, 11, 15, 16-22, 27, 33-37, 39-42, and 44-48 have been amended; and claims 49-58 have been added.

Claim Rejections - 35 USC § 112

3. Claims 14, 24, 38, and 48 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In light of the reference of Brightwell et al. US 6,568,911, cited in the office action on the merits that follows, it is unclear what applicant defines as a unit of measure for the performance of the claimed apparatus and method for its operation. In column 4, Brightwell provides a table entitled "Typical Performance Data," in which performance data, observed for an operation cycle of 8 hrs, for compressor arrangement is disclosed. In light of this disclosure the recitation of "0.5 in^3 at about 2200 psi per cycle" is unclear and one of ordinary skill in the art would not be able to determine the conditions, such as operating time, under which an operation of the of the instant application could yield such a result. It is further noted by the examiner that a cycle could be defined as a single instance in which a high-pressure chamber is filled and emptied by one downward and subsequent upward motion of a the piston assembly as claimed over a complete range of motion in both directions. It is further

noted that applicant does recite "0.5 in^3 at about 2200 psi per cycle" in lines 1-2 of page 3, and lines 4-5 of page 8, but does not include a definition of the "cycle" as claimed or disclosed.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 3, 12-18, 22, 24, 27, 36, 42, 46, 48-58 rejected under 35 U.S.C. 103(a) as being unpatentable over Brightwell et al. US 6,568,911 in view of Jones 4,856,967. Brightwell teaches all the limitations as claimed for a multi-stage pump, as shown in figure 2, and a method for pressurizing a volume of fluid including: a housing 5 having an input line, as line defined with element 13, for receiving a fluid at a specified input pressure and an output line, as line defined with element 16, for delivering the fluid at a specified output pressure higher than the specified input pressure (col. 2 ll. 61-67), a first piston, piston B as shown in figure 2, operable in an expansion stroke and a compression stroke in a first piston chamber, chamber B as shown in figure 2, in the housing 5, the first piston chamber, chamber B, having a first inlet, as line defined with element 13 is in communication with changing volume designated by

element 12, in fluid communication with the input line and a first outlet 20, wherein during the expansion stroke fluid is drawn into the first piston chamber, chamber B, through the first inlet, as line defined with element 13, at the first specified pressure and during the compression stroke the fluid is forced out through the first outlet 20, a second piston, piston A as shown in figure 2, operable in an expansion stroke and a compression stroke in a second piston chamber, chamber A as shown in figure 2, in the housing 5, the second piston chamber, chamber B, having a second inlet, as line defined with element 17, in fluid communication with the first outlet 20 of the first piston chamber, chamber B, and a second outlet, as line defined with element 16 is in communication with changing volume designated by element 15, in fluid communication with the output line, as defined with element 16, wherein the second piston chamber, chamber A, has a smaller volume than the first piston chamber, chamber B, clearly shown in figure 2, wherein during the expansion stroke fluid is drawn into the second piston chamber, chamber A, through the second inlet, line defined with element 17, and during the compression stroke the fluid is forced out through the second outlet, defined as line with element 16 in communication with element 15, at the second specified pressure, a first check valve 13 to prevent fluid flow from the first inlet to the input line, as defined by line with element 13, a second check valve 17 to prevent fluid flow from the second inlet, line defined with element 17, to the first outlet 20, a third check valve 16 to prevent fluid flow from the output line, as line defined with element 16, to the second outlet, defined as line with element 16 in communication with element 15, a connecting member 11 securing the first piston, piston B, and the second piston, piston A, together in a spaced apart manner along a common axis, as shown in figure 2, the connecting member 11 reciprocating such that when the first piston, piston B, is in an expansion stroke, the second piston, piston A, is in a compression stroke, and

when the first piston, piston B, is in a compression stroke, the second piston, piston A, is in an expansion stroke (col. 2 ll. 44-49; col. 3 ll. 26-53); a multistage pumping apparatus and a step for a method of pressurizing wherein the fluid is a gas (col. 2 ll. 44-49); a multistage pumping apparatus capable of performing a method for pressurizing wherein gas includes concentrated oxygen (col. 2 ll. 44-49); a multistage pumping apparatus and a step for the method of pressurizing wherein a ratio of the volume of the first piston chamber, chamber B, to the volume of the second chamber, chamber A, is about 12:5 to 1:0 (col. 4 ll. 11-14); a multistage pumping apparatus and a step for the method of pressurizing wherein a pump is capable of pumping about 0.5 in^3 of gas at about 2200 psi per cycle, as the pumping arrangement of Brigthwell is capable of providing 488 in^3/min at 3363 psi per the disclosure of the table of "Typical Performance Data" in column 4 (note the units as discussed have been converted from 8 L/min flow rate delivered during an 8 hour cycle).

Brightwell fails to teach the following limitations that are taught by Jones for a pump for pressurizing a fluid including: a multistage pumping apparatus, as shown in figure 1, and a step for a method of pressurizing wherein a connecting member 40 includes a threaded screw 42 having threads along a portion of its length, a ball screw drive system, as defined with elements 40, 42, 44, 46, 48, 52, and 60, in communication with the threads, via element 46, on the connecting member 40 for reciprocating such that when a first piston 240 is in an expansion stroke, a second piston 32 is in a compression stroke; and a multistage pumping apparatus and a step for a method of pressurizing wherein a connecting member 40 includes a threaded screw 42, a drive system, as defined with elements 40, 42, 44, 46, 48, 52, and 60, including a reversible motor 60 engaging a threaded screw 42 alternating the connecting member 40 in opposite directions to cause reciprocating linear translation, as shown by directional arrow

designated by element 44 in figure 1, of the connecting member 40 and pistons, 240 and 32. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a drive system including a reversible motor on a reciprocating piston provide a motive force with a low power motor to provide an accurate quantity of high pressure gas (col. 3 ll. 10-20; ll. 35-41).

7. Brightwell teaches all the limitations as claimed for a multi-stage pump and a method for compressing a volume of fluid including: a housing 5 having a first cylindrical chamber, chamber B as shown in figure 2, and a second cylindrical chamber, chamber A as shown in figure 2, the first chamber, chamber B, having a first inlet, as defined by line with element 13, and a first outlet 20, the second chamber, chamber A, having a second inlet, as line defined with element 17, and a second outlet, as line defined with element 16, the second inlet, line defined with element 17, of the second chamber, chamber A, being in communication with the first outlet 20 of the first chamber, chamber B, a first piston, piston B, positioned within the first chamber, chamber B, to define a first piston chamber, as shown in figure 2 with chamber B and volume designated by element 12, a second piston, piston A, positioned within the second chamber, chamber A, to define a second piston chamber, as shown in figure 2 with chamber A and volume designated by element 15, the volume of the first piston chamber, chamber B, being larger than the volume of the second piston chamber, chamber A, (col. 4 ll. 11-14) a connecting member 11 for securing the first and second pistons, pistons B and A respectively, together in a spaced apart manner along a common axis, as shown in figure 2, and extending between the first and second chambers, chambers B and A respectively, the connecting member 11 reciprocating the first and second pistons, piston B and A respectively, in unison within the first and second piston chambers, as defined by pistons B and A and

volumes designated by elements 12 and 15 within chambers B and A respectively, such that when the first piston, piston B, is moving in an expansion stroke, fluid is drawn into the first piston chamber, chamber B, through the first inlet, line defined with element 13, and at the same time, the second piston, piston A, is moving in a compression stroke where fluid is expelled from the second piston chamber, chamber A, through the second outlet, line as defined with element 16, and when the first piston, piston B, is moving in a compression stroke, the second piston, piston A, is moving in an expansion stroke where fluid to be is expelled from the first piston chamber, chamber B, through the first outlet 20 and into the second piston chamber, chamber A, through the second inlet, line defined with element 17, where the fluid is compressed due to the reduced volume of the second piston chamber, chamber A, a check valve system, elements 13, 16, and 17, for a unidirectional flow of fluid from the first inlet, line as defined with element 13, to the second outlet, line as defined with element 16; check valve system, elements 13, 16, and 17, comprises a first check valve 13 in communication with the first inlet, line as defined with element 13 in communication with volume designated by element 12, for preventing fluid from exiting the first piston chamber, chamber B, through the first inlet, line as defined with element 13 in communication with volume designated by element 12; a multistage pumping apparatus and a step for a method of compressing wherein a check valve system comprises a second check valve 17 disposed between the first outlet 20 and the second inlet, line defined with element 17, for preventing fluid from exiting the second piston chamber, chamber A, through the second inlet, line as defined with element 17 in communication with volume designated by element 15; a multistage pumping apparatus and a step for a method of compressing wherein a check valve system comprises a third check valve 16 in communication with the second outlet, as defined by line with element 16, for preventing fluid from entering

the second piston chamber, chamber A, through the second outlet, line as defined with element 16 in communication with volume designated by element 15; a multistage pumping apparatus and a step for a method of compressing wherein the fluid is a gas (col. 2 ll. 44-49); a multistage pumping apparatus capable of performing a method for compressing wherein a gas includes concentrated oxygen (col. 2 ll. 44-49); a multistage pumping apparatus and a step for a method of compressing wherein a ratio of the volume of the first piston chamber to the volume of the second chamber is about 12:5 to 1:0 (col. 4 ll. 11-14); and a multistage pumping apparatus and a step for a method of compressing wherein a pump is capable of pumping about 0.5 in^3 of gas at about 2200 psi per cycle, , as the pumping arrangement of Brigthwell is capable of providing 488 in^3/min at 3363 psi per the disclosure of the table of "Typical Performance Data" in column 4 (note the units as discussed have been converted from 8 L/min flow rate delivered during an 8 hour cycle).

Brightwell fails to teach the following limitations that are taught by Jones for a pump for compressing a fluid including: a multistage pumping apparatus and a step for a method of compressing wherein a drive system, as defined by elements 40, 42, 44, 46, 48, 52, and 60, including a rotatable ball screw nut 44 engaged with the threaded screw 42 and a reversible motor 60 for alternately rotating in opposite directions to cause reciprocating linear translation of the connecting member 40 and pistons, elements 240 and 32. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a drive system including a reversible motor on a reciprocating piston provide a motive force with a low power motor to provide an accurate quantity of high pressure gas (col. 3 ll. 10-20; ll. 35-41).

8. Claims 9-11, 19-21, 34-36, and 43-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brightwell 6,568,11 i.v. Jones 4,856,967, as applied to claims 15, 39, 49, and

54 above, and further in view of Gerhardt et al 6,712,587. A combination of the references as discussed teaches all the limitations including a pressure sensor, with the embodiment of Figure 4 of Jones with element 712, for sensing pressure of fluid expelled from a second piston chamber, element 24 of "Pump 1" as shown. A combination of the references as discussed fails to teach the follow limitations for a pumping configuration and a method for pressurizing or compressing a fluid including: a piston position sensing system, elements 44 and 46, coupled to a drive, elements 10, 12, and 14, to detect when the pistons, elements 22 and 26, have reached a predetermined stroke and to reverse the drive system (col. 4 ll. 26-33); and a first pressure sensor 40 for sensing pressure in the first piston chamber 20. It is noted that Gerhardt teaches, on lines 13-15 on column 2, that a pressure sensor, such as the one taught by Jones (element 712), for a second chamber may be obviated by the pumping configuration disclosed. However by doing so, Gerhardt teaches that this feature was known for a pumping configuration, analogous to that which is claimed, in the art at the time of the instant application. It would have been obvious to one having ordinary skill in the art to provide a piston positioning system for a motor driven pump in order to supply a constant flow rate of a high pressure or compressed fluid (Gerhardt – col. 1 ll. 53-56).

9. Claims 13, 23, 38, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brightwell et al. US 6,568,911 in view of Jones 4,856,967. A combination of Brightwell and Jones as discussed teaches the claimed invention except for the express disclosure of a first and second pistons having a stroke of about 6 inches. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a pumping configuration having a first and second pistons having a stroke of about 6 inches, since the claimed values are merely an optimum or workable range. It has been held that where the general conditions

of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Response to Arguments

10. Applicant's arguments with respect to claims 5-11, 15-21, 36-37, and 46-47 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonard J. Weinstein whose telephone number is (571) 272-9961. The examiner can normally be reached on Monday - Thursday 7:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Karmer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LJW

DEVON C. KRAMER
PATENT EXAMINER
10/22/07